

Original Research

Determination of the effects of psychological stress on lipid profiles of patients

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ABSTRACT:

Background: Dyslipidemia is a group of disorders associated with deranged plasma lipids and lipoprotein levels. This study was conducted to determine the effects of psychological and physical stress on lipid profiles of patients. **Materials & Methods:** The present study was conducted on 120 subjects of both genders. Lipid profile included estimation of total cholesterol levels (TC), triglycerides (TG's), LDL cholesterol levels, VLDL and HDL cholesterol levels. General Health Questionnaire 12 (GHQ12) self-administered questionnaire for general health assessment was used. **Results:** There were 50 males and 70 females in present study. There were 50 subjects of high stress and 20 of low stress with TG >200, 40 subjects and 25 of high and low stress respectively with TC >240, 30 high stress and 28 low stress with LDL > 160 and 20 males and 10 females with HDL >40 and 50 respectively. The difference was significant (P< 0.05). **Conclusion:** Authors found that there is more dyslipidemia in stressful patients as compared to non stress one. Dyslipidaemia is a modifiable CVD risk factor.

Key words: Dyslipidaemia, Lipid, Stress.

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INTRODUCTION

Dyslipidemia is a group of disorders associated with deranged plasma lipids and lipoprotein levels. It is the most important risk factor responsible for the genesis of atherosclerosis leading to coronary heart disease, cerebral vascular disease and peripheral vascular disease. Lipid disorders are prevalent in the world. Some of their risk factors are modifiable such as mental and physical stresses. The main etiology of lipid disorders is genetic factor and family history that is not changeable.¹ In psychological sciences, stress is a feeling of mental press and tension. Low levels of stress might be desired, useful, and even healthy.² Stress, in its positive form, can improve biopsychosocial health and facilitate performance. Furthermore, positive stress is considered as an important factor to motivation, adaptation, and reaction to surrounding environment. However, high levels of stress could result in biological, psychological, and social problems and even serious harms to people.³ Stress may be either external with

environmental source, or caused by internal perceptions of the individual. The latter form, in turn can produce anxiety, and/or other negative emotions and feelings such as press, pain, sadness, etc., and result in serious psychological disorders such as post-traumatic stress disorder (PTSD).⁴ Cardiovascular diseases (CVD) are recognized as important threats to human health. It is the leading cause of death. Blood lipids are influenced by nutrition, body weight, physical activity, medications and genetic factors. Evidence suggests that blood lipids are also affected by mental status.⁵ The association between high serum cholesterol level, especially high LDL-C and coronary artery disease (CAD) is casual and independent of other risk factors. This study was conducted to determine the effects of psychological and physical stress on lipid profiles of patients.

MATERIALS & METHODS

The present study was conducted in the Medicine department after the approval from the ethical

committee of the institution. All involved patients were informed regarding the study and their written consent was obtained. It comprised of 120 subjects of both genders.

A thorough clinical examination was done. A detailed questionnaire containing questions on health, diet, smoking, drinking habits and lifestyle was recorded. Laboratory investigations such as weight, height, waist circumference, hip circumference, ECG and BMI were done. 5 ml of fresh 12 hour fasting venous sample was collected by venupuncture after inserting dwelling cannula for assessing lipid profile and other routine investigation like Hb, TLC, DLC, FBG and RBG. Lipid

profile included estimation of total cholesterol levels (TC), triglycerides (TG's), LDL cholesterol levels, VLDL and HDL cholesterol levels.

To evaluate stress, the General Health Questionnaire 12 (GHQ12) self-administered questionnaire for general health assessment, was used. This questionnaire consists of twelve 4-choice questions. To determine each individual's stress score based on the GHQ scoring system, choices (a) or (b) were given a score of 0 and for choices (c) and (d) a score of 1 was considered. A total score ≥ 4 was considered high GHQ (i.e. high stress). Results were analyzed statistically. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 120		
Gender	Male	Female
Number	50	70

Table I shows that there were 50 males and 70 females in present study.

Graph I Dyslipidemia associated with stress level

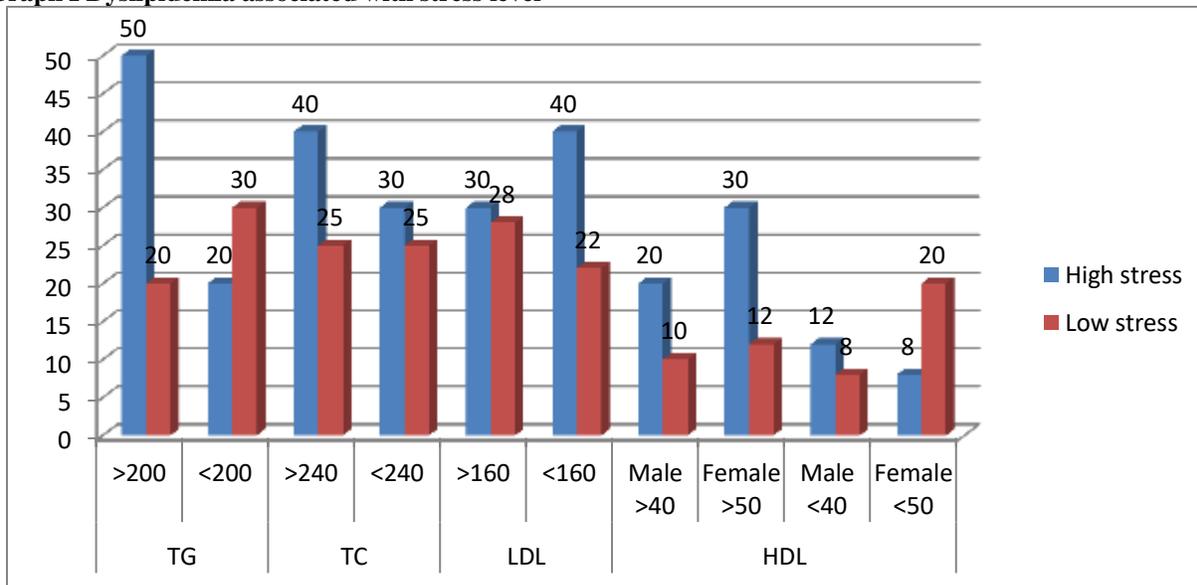


Table II Dyslipidemia associated with stress level

Lipid (mg/dl)	Value	High stress	Low stress	P value
TG	>200	50	20	0.04
	<200	20	30	
TC	>240	40	25	0.02
	<240	30	25	
LDL	>160	30	28	0.01
	<160	40	22	
HDL	Male >40	20	10	0.05
	Female >50	30	12	
	Male <40	12	8	
	Female <50	8	20	

Table II, graph I shows that there were 50 subjects of high stress and 20 of low stress with TG >200, 40 subjects and 25 of high and low stress respectively with TC >240, 30 high stress and 28 low stress with LDL > 160 and 20 males and 10 females with HDL >40 and 50 respectively. The difference was significant (P< 0.05).

DISCUSSION

The metabolism and plasma levels of lipids and lipoproteins are influenced by several non-genetic factors, including both dietary as well as other lifestyle factors, age, gender and the degree and distribution of body fat. Of all dietary constituents, the amount and composition of fatty acids and the amount of cholesterol seem to be the most important modulators of serum lipid and lipoprotein metabolism, and therefore have been targeted in dietary recommendations aimed at reducing lipoprotein levels and CAD risk.⁶ Humans experience higher total or fractional cholesterol around laboratory stress sessions, compared to rest periods or control groups. Stress hormones even correlate directly with serum lipids, in some research. Many biological mechanisms could explain this positive relationship between stress hormones and lipids. Individuals deemed high stress reactors (based on stress hormone levels) even had higher cholesterol at three-year follow-up, as well as greater central adiposity.⁷ This study was conducted to determine the effects of psychological and physical stress on lipid profiles of patients.

In present study, there were 50 males and 70 females. A study demonstrated the association between job stress and combined dyslipidemia among workers. Effort, overcommitment and low reward increased the risk of dyslipidemia among Chinese workers, and they were significantly associated with TG and LDL-C rather than TCHO or HDL-C. Increasing blood lipids may be the possible link between job stress and coronary heart disease.⁸

We found that there were 50 subjects of high stress and 20 of low stress with TG >200, 40 subjects and 25 of high and low stress respectively with TC >240, 30 high stress and 28 low stress with LDL > 160 and 20 males and 10 females with HDL >40 and 50 respectively. A study showed lipid disorders in people with jobs that had psychological stress. Subjects with a higher level of perceived demands had higher levels of CHOL, LDL/HDL and TG and lower levels of HDL-c. In response to the respite, subjects experiencing more demands showed a greater decrease of LDL-c (P<.01) and LDL/HDL (P<.001). Sex moderated these stress-related respite effects for HDL-c (P<.01) and LDL/HDL (P<.005), high demand males showing a smaller decrease in HDL and a greater decrease in LDL/HDL than females in response to the respite.⁹

Shahnam¹⁰ conducted a study in which blood samples were taken to determine the lipid levels including total

cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), low levels of high-density lipoprotein cholesterol (HDL-C) and triglycerides. Stress levels were assessed using the General Health Questionnaire. Logistic regression and chi-square tests were used for statistical analysis. The odds ratios of high stress in individuals with high levels of TC, LDL-C and low levels of HDL-C compared to normal individuals after adjustment for age and sex were as follows respectively: 1.05 (1.02,1.15), 1.06 (1.02,1.18), 1.06 (1.01,1.17).

Abnormal blood lipids are a major cause of coronary heart disease (CHD) in middle-aged and older adults. Associations with CHD risk are consistent across a wide range of cholesterol levels, in men and women, and in persons as young as 40 years of age, and lowering cholesterol reduces CHD risk in these age groups. It is unclear, however, whether cholesterol levels are important earlier in life when short term CHD risk is low.¹¹ Long-term follow-up studies demonstrate associations between total cholesterol measured once during young adulthood and CHD events later in life, but this association could be wholly attributable to later-life lipid abnormalities, which are strongly associated with lipid levels earlier in life. Whether early-life lipid levels themselves cause atherosclerotic damage during young adulthood that persists into middle age is unknown.¹²

The limitation of the study is small sample size.

CONCLUSION

Authors found that there is more dyslipidemia in stressful patients as compared to non stress one. Dyslipidaemia is a modifiable CVD risk factor.

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